

The opinion in support of the decision being entered today is *not* binding
precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GUANG-HO CHA, CHIN-WAN CHUNG, DRAGUTIN
PETKOVIC, and XIAOMING ZHU

Appeal 2006-3395
Application 09/512,949
Technology Center 2100

Decided: June 22, 2007

Before KENNETH W. HAIRSTON, HOWARD B. BLANKENSHIP, and
ALLEN R. MACDONALD, *Administrative Patent Judges*.

BLANKENSHIP, *Administrative Patent Judge*.

DECISION ON APPEAL

This appeal involves claims 1-24, the only claims pending in this
application. We have jurisdiction under 35 U.S.C. §§ 6(b), 134(a).

INTRODUCTION

The claims are directed to methods and systems for indexing objects in high dimensional data spaces (e.g., digital images) to respond to user queries. Claims 1 and 8 are illustrative:

1. A computer programmed to undertake method acts for querying for data using a query, the method acts undertaken by the computer including:

for at least some data vectors in a data space, generating respective approximations in polar coordinates; and

based on the approximations, returning “k” nearest neighbors to the query.

8. A computer program product including a program of instructions having:

computer readable code means for generating approximations including local polar coordinates of at least some data vectors p in at least one data set having a dimensionality of “d”, the local polar coordinates being independent of “d”; and

computer readable code means for using the approximations to return “k” nearest neighbors to a query.

The Examiner relies on the following prior art references to show unpatentability:

Staats	US 5,619,717	Apr. 8, 1997
Fayyad	US 6,263,334 B1	Jul. 17, 2001 (Filed Nov. 11, 1998)

Department of Mathematics, *Coordinate Systems in Two and Three Dimensions* (“Coordinate Systems”), 1-4, Oregon University, (1996), available at <http://oregonstate.edu/dept/math/CalculusQuestStudyGuides/vcalc/coord/coord.html>.

The rejections as presented by the Examiner are as follows:

1. Claims 8-14 and 23 are rejected under 35 U.S.C. § 101 as being directed to nonstatutory subject matter.
2. Claims 1-4, 8-12, 15-18, and 22-24 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Fayyad and “Coordinate Systems.”
3. Claims 5-7, 13, 14, and 19-21 are rejected under 35 U.S.C § 103(a) as unpatentable over Fayyad, “Coordinate Systems,” and Staats.

OPINION

The Examiner in the Answer¹ contends that claim 8 and its depending claims are drawn to subject matter that is not statutory under 35 U.S.C. § 101. According to the rejection, claim 8, reciting a “computer program product including a program of instructions” in the preamble, is not embodied on a computer readable medium. (Answer 6.) The “computer program product” is considered as software; “it is possible to write on a sheet of paper with a pen or pencil and therefore it is not considered as a computer readable medium.” (*Id.* 12.)

In Appellants’ view, claim 8 recites (in the body) “computer readable code means,” which is described in the Specification (6: 13-21) as module 14. The Specification refers to module 14 as computer-executable instructions that may be contained on a data storage device with a computer readable medium, such as a computer diskette, random access memory of the computer, or various other data storage devices. Appellants submit that claim 8 thus cannot be considered as mere software or writing on a paper.

¹ Mailed July 7, 2006.

Instant claim 8 contains elements in means plus function format, as permitted under 35 U.S.C. § 112, sixth paragraph. The scope of the claimed elements is thus limited to the corresponding structures in the disclosure and their equivalents. The limitations under 35 U.S.C. § 112, sixth paragraph must be interpreted by reference to the corresponding disclosure. *See, e.g., In re Lonardo*, 119 F.3d 960, 967, 43 USPQ2d 1262, 1267 (Fed. Cir. 1997) (citing *In re Donaldson Co.*, 16 F.3d 1189, 1193, 29 USPQ2d 1845, 1849 (Fed. Cir.1994) (en banc)); *In re Alappat*, 33 F.3d 1526, 1541, 31 USPQ2d 1545, 1555 (Fed. Cir. 1994) (en banc).²

Instant claim 8 requires more than software per se, but also structure. Assuming that a piece of paper can be considered “structure,” a piece of paper is not a structural equivalent to the exemplary data storage devices provided at page 6 of the Specification. With all of the storage devices listed in the Specification, the computer-executable code can be immediately and directly loaded into a computer (or processor) for execution, unlike a source code listing on a sheet of paper.

We therefore hold that claim 8 and its depending claims require, at the least, computer-executable code embodied in a tangible medium, notwithstanding how the preamble might be interpreted if divorced from the remainder of the claim. Because we agree with Appellants that the Examiner has failed to demonstrate that the claimed subject matter is not statutory, we do not sustain the § 101 rejection of claims 8-14 and 23.

² Lack of any structure in the disclosure corresponding to the “means” indicates that the claims fail to pass muster under 35 U.S.C. § 112, second paragraph. *See, e.g., Atmel Corp. v. Information Storage Devices, Inc.*, 198 F.3d 1374, 1381-82, 53 USPQ2d 1225, 1230 (Fed. Cir. 1999); *In re Dossel*, 115 F.3d 942, 944-46, 42 USPQ2d 1881, 1883-85 (Fed. Cir. 1997).

Turning to the rejection of claims 1-4, 8-12, 15-18, and 22-24 under 35 U.S.C. § 103(a), we note that all of the claims require specified operations using polar coordinates. Claim 1, for example, recites “for at least some data vectors in a data space, generating respective approximations in polar coordinates”

According to the rejection, Fayyad teaches all the subject matter of the independent claims (1, 8, and 15), but does not teach “explicitly” polar coordinates. The rejection contends that “Coordinate Systems” teaches conversion of Cartesian to polar coordinates, and vice versa. The rejection concludes that it would have been obvious to use a polar coordinate system in Fayyad’s method: first, for general convenience; and second because “Coordinate Systems” teaches that polar coordinates are easier to use in situations where circular, cylindrical, or spherical symmetry is present. (Answer 7-8.)

Appellants respond (Br. 6-7)³ that none of the equations would work in polar coordinates in the “approximation,” or probability function, on which the rejection relies (Fayyad col. 7, l. 54 - col. 8, l. 14).

We do not find any response to Appellants’ position in the Answer. The Examiner does, however, submit (Answer 13 and 14) that in order to draw polar coordinates on a computer screen, it is well known that the coordinates have to be converted into Cartesian coordinates according to known formulas. No explanation is offered, however, as to how the allegation of what “is well known” might relate to the subject matter that is claimed.

³ Filed October 22, 2005.

The Examiner's position seems to cut against the rationale for the rejection that has been applied. Contrary to the implications of the statement of the rejection, it would not be more convenient to add two extra steps to the Fayyad method in order to perform the approximations using polar coordinates -- i.e., converting data from Cartesian to polar, performing the approximations, and then (at some later point) converting the results to Cartesian coordinates for display of the data. As for the second offered reason to modify Fayyad, there has been no showing, or explanation offered, as to why the artisan would appreciate that the operations described by Fayyad relate to circular, cylindrical, or spherical symmetry, even though the reference does not, admittedly, show generating approximations using polar coordinates.⁴

The rejection thus has not shown suggestion from the prior art for modifying the relevant operations described by Fayyad. Nor has the rejection met a lesser standard, such as by showing that the artisan would have considered the use of either polar or Cartesian coordinates to be equivalent in the system described by Fayyad.

In order to determine whether there was an apparent reason to combine known elements in the fashion claimed, the analysis should be made explicit. *KSR Int'l v. Teleflex Inc.*, 127 S. Ct. 1727, 1741, 82 USPQ2d 1385, 1396 (2007) (citing *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329,

⁴ There may be at least suggestion for using polar coordinates in Figure 3B and column 9, lines 14 through 35 of Fayyad, which relate to scanning of clusters most likely to contain the nearest neighbor based on a probability estimate. In any event, the rejection relies on the probability function described at columns 7 and 8 as the claimed "approximation," rather than the material at column 9 of the reference.

1336 (Fed. Cir. 2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”). On the basis of the evidence provided, the Examiner’s findings and Appellants’ response, we conclude that a prima facie case for unpatentability has not been set forth for the subject matter of any of the independent claims.

We therefore do not sustain the § 103(a) rejection of claims 1-4, 8-12, 15-18, and 22-24. Since Staats as applied in the combination against dependent claims 5-7, 13, 14, and 19-21 does not remedy the deficiencies in the rejection applied against the base claims, neither do we not sustain the § 103(a) rejection of those claims.⁵

CONCLUSION

The rejection of claims 8-14 and 23 under 35 U.S.C. § 101 as being directed to nonstatutory subject matter is reversed. The rejection of claims 1-24 under 35 U.S.C. § 103(a) over the applied prior art is reversed.

REVERSED

tdl/ce

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⁵ The Examiner seems to respond (Answer 14-15) to arguments not made in the Brief. An earlier rejection, alleging lack of enabling disclosure, was withdrawn *sub silentio* in the nonfinal rejection mailed October 4, 2004. No § 112 rejection is before us.